

# PALM TECHNOLOGY CO., LTD.

*The LCD(M) Specialist*

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PART NO. : PMC4002A-SYL

FOR MESSRS. : \_\_\_\_\_

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ACCEPTED BY : \_\_\_\_\_ PROPOSED BY : \_\_\_\_\_

## RECORD OF REVISION

DATE	PAGE	SUMMARY

### 3. General specifications

#### 3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-12780)”.

#### 3.2 This individual specification is prior to general specifications

### 4. Mechanical data

- (1) NUMBER OF CHARACTERS-----40 CH \* 2 LINE
- (2) MODULE SIZE-----182.0 W \* 33.5 H \* 15.0 T (Max) mm
- (3) EFFECTIVE AREA-----154.0 W \* 15.3 H mm
- (4) CHARACTER PATTERN-----5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE -----3.20 W \* 4.85 H mm
- (6) CHARACTER PITCH-----3.70 mm
- (7) DOT SIZE -----0.60 W \* 0.65 H mm
- (8) DOT PITCH -----0.65 W \* 0.70 H mm
- (9) VIEWING DIRECTION-----6 O’CLOCK
- (10) LCD TYPE-----STN.YELLOW-GREEN.TRANSFLECTIVE.
- (11) LED COLOR -----YELLOW-GREEN

## 5. Absolute maximum ratings

### 5.1 Electrical absolute maximum ratings

<i>I T E M</i>	<i>SYMBOL</i>	<i>MIN.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>COMMENT</i>
POWER SUPPLY FOR LOGIC	V <sub>DD</sub> -V <sub>SS</sub>	0	6.0	V	-----
INPUT VOLTAGE	V <sub>I</sub>	V <sub>SS</sub>	V <sub>DD</sub>	V	-----
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)

NOTE (1): ELECTRO-STATIC DISCHARGE RESISTANCE IS TESTED BY CHARGING A 200PF CAPACITOR AND DISCHARGING IT BY CONTACT WITH A INTERFACE CONNECTOR PIN.

### 5.2 Environmental absolute maximum ratings

<i>I T E M</i>	<i>OPERATING</i>		<i>STORAGE</i>		<i>COMMENT</i>
	<i>MIN.</i>	<i>MAX.</i>	<i>MIN.</i>	<i>MAX.</i>	
AMBIENT TEMPERATURE	0°C	50°C	-20°C	70°C	-----
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	-----	0.5G	-----	2G	10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	-----	3G	-----	50G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		-----

NOTE (2): Ta ≤ 50°C: 90% RH MAX.

Ta > 50°C: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50°C. (80% RH AT 60°C)

NOTE (3): 1G = 9.8 m/s<sup>2</sup>

**6. Electrical characteristics** $T_a = 25^\circ\text{C}$      $V_{DD} = 5.060.25\text{ V}$ 

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	
INPUT VOLTAGE	$V_{IH}$	-----	2.2	-----	$V_{DD}$	V	
	$V_{IL}$	-----	-----	-----	0.6	V	
OUTPUT VOLTAGE	$V_{OH}$	$-I_{OH} = 0.2\text{ mA}$	2.4	-----	-----	V	
	$V_{OL}$	$I_{OL} = 1.2\text{ mA}$	-----	-----	0.4	V	
POWER SUPPLY CURRENT	$I_{DD}$	$V_{DD} = 5.0\text{V}$	-----	2.0	3.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE	$V_{DD}-V_o$	DUTY = 1/16 $\Phi = 10^\circ$ $\theta = 0^\circ$	$T_a = 0^\circ\text{C}$	-----	4.9	-----	V
			$T_a = 25^\circ\text{C}$	-----	4.5	-----	V
			$T_a = 50^\circ\text{C}$	-----	4.1	-----	V
POWER SUPPLY CURRENT FOR LED	$I_{LED}$	$V_{DD} = 5.0\text{V}$	-----	250	350	mA	

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT 6 0.5V BY EACH MODULE.

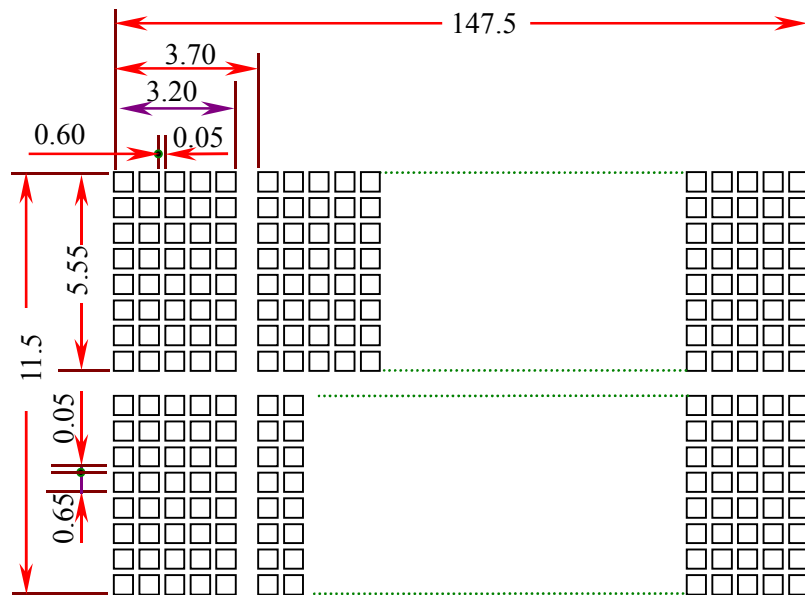
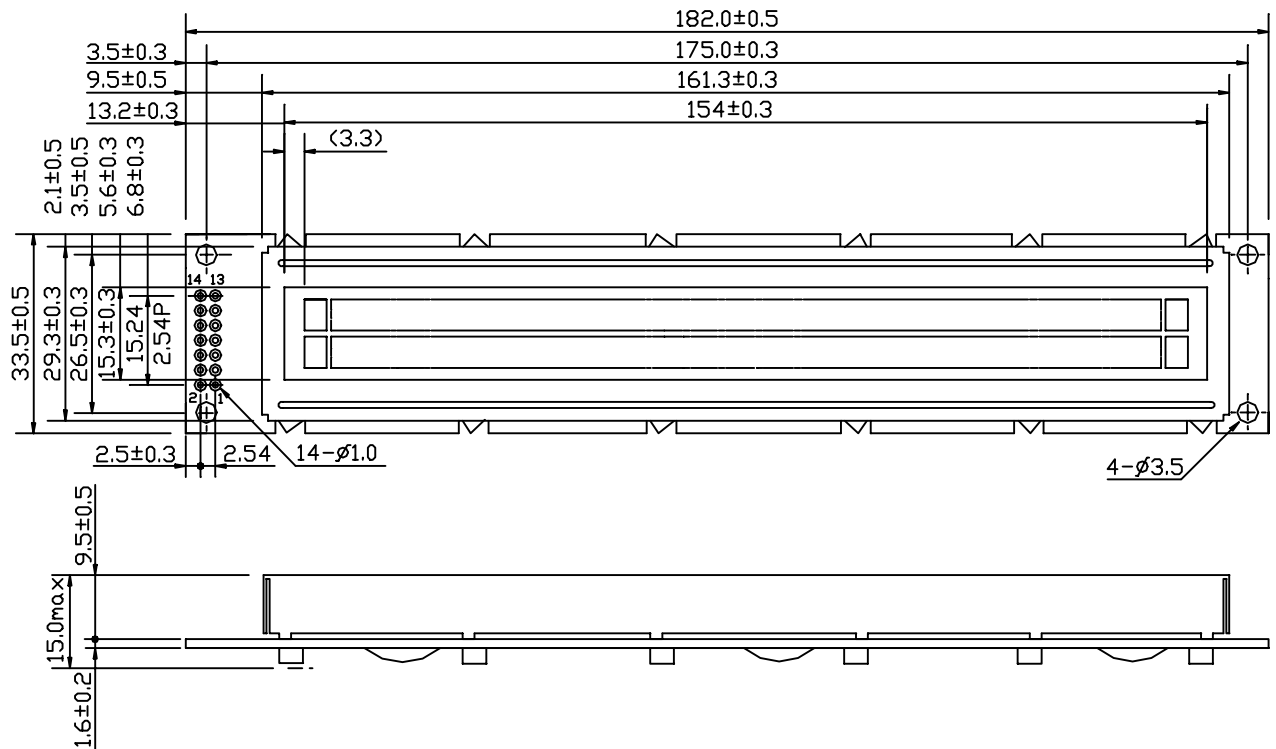
**7. Optical characteristics** $T_a = 25^\circ\text{C}$      $V_{DD} = 5.0\text{V}$ 

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
VIEWING ANGLE	$\Phi 2-\Phi 1$	$K = 2.0$	30	40	-----	deg.	2
CONTRAST RATIO	K	$\Phi = 10^\circ$ $\theta = 0^\circ$	4.0	5.0	-----	-----	2
RESPONSE TIME	tr (rise)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	200	350	ms	2
	tf (fall)	$\Phi = 10^\circ$ $\theta = 0^\circ$	-----	250	400	ms	2
BRIGHTNESS FOR LED BACKLIGHT	B	$\Phi = 0^\circ$ $\theta = 0^\circ$	6.0	-----	-----	$\text{cd/m}^2$	2,3

NOTE (2): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

NOTE (3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

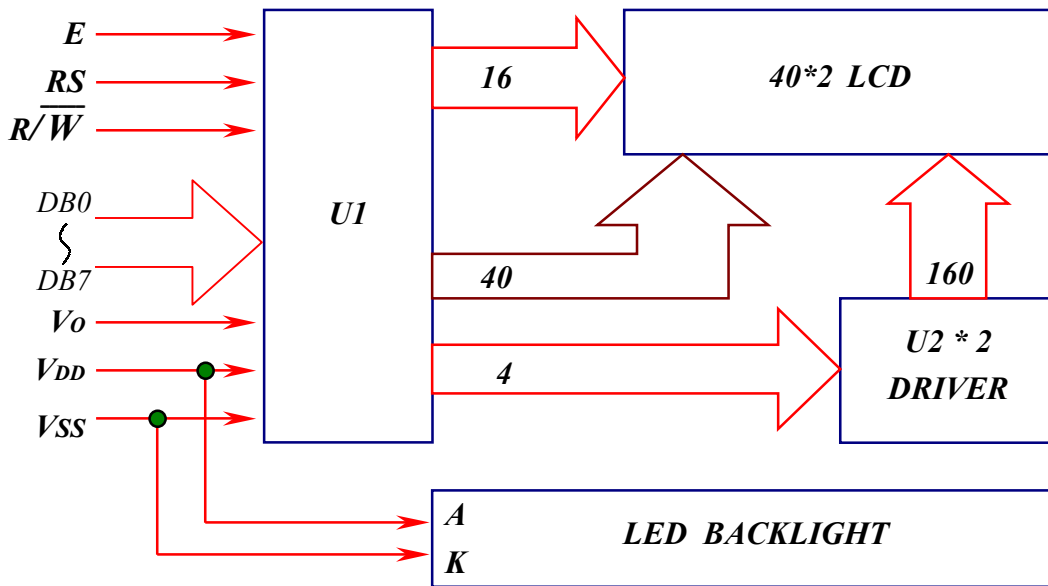
### 8. Outline dimension



### Interface pin connection

<b>PIN NO.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
SYMBOL	V <sub>SS</sub>	V <sub>DD</sub>	V <sub>O</sub>	RS	R/ $\bar{W}$	E	DB0
<b>PIN NO.</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
SYMBOL	DB1	DB2	DB3	DB4	DB5	DB6	DB7

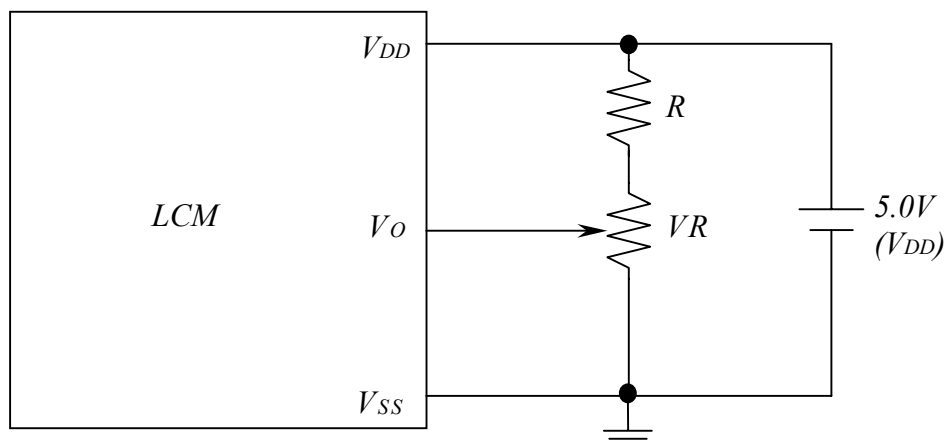
### 9 Block diagram



Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13
LINE 2	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	50	51	52	53

Character	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
LINE 1	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27
LINE 2	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	60	61	62	63	64	65	66	67

### 10. Power supply for LCM



RECOMMENDED RESISTOR R:  $V_{DD}-V_o \geq 1.5V$

$V_{DD}-V_o$ : LCD DRIVING VOLTAGE

$V_R$ :  $10K\Omega \sim 20K\Omega$